

Notice of Allowability

Application No.

10/019,080

Examiner

Agustin Bello

Applicant(s)

COTTER, DAVID

Art Unit

2633

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to the amendment filed 2/28/2005.
2. ☒ The allowed claim(s) is/are 1-15.
3. ☒ The drawings filed on 28 February 2005 are accepted by the Examiner.
4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☐ All b) ☐ Some* c) ☐ None of the:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).
 - * Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
6. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO-1449 or PTO/SB/08),
Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit
of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☐ Interview Summary (PTO-413),
Paper No./Mail Date _____
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____

EXAMINER'S AMENDMENT

1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Mr. Nixon on 8/4/2005.

The application has been amended as follows: Claim 14 has been amended to depend from claim 7 instead of claim 17.

2. The following is an examiner's statement of reasons for allowance: the prior art fails to specifically teach or clearly suggest an optical regenerator including: (a) a data division stage arranged to receive an incoming optical data stream having a bit rate and to divide the incoming optical data stream into a plurality of further optical data streams each having a lower bit rate than the bit rate of the incoming data stream', and (b) a regeneration stage, including a plurality of optical gate means, each arranged to receive a respective one of the further data streams at its control input and to receive at another input an optical clock stream at the frequency of the bit rate of the further data streams or a multiple thereof, wherein the outputs of the gate means are connected in common to an optical output of the regenerator and arranged to provide a bit-interleaved regenerated optical data stream at the said output.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue

Art Unit: 2633

fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."


Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Agustin Bello whose telephone number is (571) 272-3026. The examiner can normally be reached on M-F 8:30-6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan can be reached on (571)272-3022. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

AB


AGUSTIN BELLO
PATENT EXAMINER

(a) dividing an incoming optical data signal at a bit rate into a plurality of further data streams each having a lower bit rate than the bit rate of the received optical signal;

(b) gating under the control of the plurality of further data streams a clock signal at the frequency of the bit rate of the further signals or a multiple thereof; and interleaving the optical signals produced by step (b) thereby creating a regenerated optical signal at the bit rate of the received optical data signal.

Systems embodying the present invention will now be described in further detail by way of example only, with reference to the accompanying drawings in which:

Figure 1 is a schematic of an optical regenerator embodying the invention;

Figure 2 is a diagram showing an optical gate suitable for use in the regenerator in Figure 1;

Figure 3 is a diagram showing a gate array for use in the regenerating stage of an asynchronous optical regenerator embodying the invention.

An optical regenerator comprises an optical data division stage 1 and an optical regeneration stage 2. An optical time division multiplexed (OTDM) data stream at a high bit rate, in this example 160Gbit/s, is received at an optical input 3 of the data division stage 1. Divided data streams at a lower bit rate, in this example 80Gbit/s are passed from optical outputs 4a, 4b of the data division stage 1 into the optical regeneration stage 2. The data streams are used to gate an optical clock signal at the frequency of the lower bit rate or a multiple thereof, in this example 80 GHz, so as to produce at the optical output 5 of the regeneration stage 2 a regenerated high bit-rate optical data stream.

In a regenerator for use with a synchronous data stream, the data division and regeneration stages require in total $2n$ optical gates where n is the ratio between the bit rate of the optical data stream and the lower bit rate of the divided data streams input to the regeneration stage 2. In the present example, $n=2$ and there are two optical gates in the division stage 1 and a further two optical gates in the regeneration stage 2. As shown in Figure 1, each of the two gates in the division stage 1 is connected in common to the optical input 3 and is driven by the 160Gbit/s optical pulse stream. An optical clock signal at the lower bit rate of 80GHz is applied

* Figure 4 is a diagram showing a network comprising nodes that include regenerators